Aero Design Ltd.

Work Order Control Sheet

Work Order#: 2016-73 **Date Opened:** 11-May-16 **Title:** Fabrication

Aircraft OEM: Bell **Aircraft Model:** 429 **Product Type:** Beams **Product Model:** RH **Quantity:** 1 aft

Work Order Contents

	Initial or N/A
Work Order/Build Sheets (Procedures Provided)	created
Additional Work Sheets (Standard Practice)	N/A
Drawings (See List Below)	JC
Parts Distribution Sheet	JC
Sub Component Tags	N/A
Completed Certification (Original)	JC
Time Sheet (R&D)	N/A
Notes	N/A

Build Sheet Contents

	Initial or N/A
Tasks Initialled	JC
Dual Inspections Initialled	JC

Drawing List

Drawing #	Rev #	Description	Initial or N/A
95933	0	Aft Beam	JC

Traveller

Initial or N/A

Component Completion

	As Instructed
Quantity Complete on This Work Order	1
Quantity Incomplete on This Work Order	0
Further Processing Required Before Release	N/A
Release to Stock as Components	N/A

Certification

	Initial or N/A
Form One Completed	JC
Serviceable (Green) Tag Completed	N/A
In Process (Yellow) Tag Completed	N/A
Unserviceable (Red) Tag Completed	N/A
Parts Placed in Stores for Distribution	N/A

Additional Documentation

	Initial or N/A
Documentation of a minor change	N/A
Non-Conformance Report Required	N/A
Service Difficulty Report Required	N/A

Billing

	Initial or N/A
Local (Aero Design)	JC
Research and Development	N/A
Third Party	N/A

Work performed by:	Print: JEFF CLARKE	Sign:	SCA: AD02	Date: 15 MAY 2016
ICC / Dual Inspection preformed by:	Print: JASON REKVÉ	Sign:	SCA: AD01	Date: 17 MAY 2016
Work Order closed by:	Print: JEFF CLARKE	Sign:	SCA: AD02	Date: 17 MAY 2016

1. Approving Civil Aviation Authority/Country	2. AUTHORIZED RELEASE CERTIFICATE FORM ONE	3.Form Tracking No.
Transport Canada		2016-0066

4. Organization Name and Address	5. Work Order/Contract/Invoice
AERO Design Ltd. – 9888A Malaspina Road, Powell River, BC, V8A 0G3	WO 2016-73

6. Item	7. Description	8. Part Number	9. Qty.	10. Serial/Batch No.	11. Status/Work
	Aft Beam	95933-01-00	1	N/A	New

12. Remarks

Primed, without release lever and associated parts.

13a. Certifies that the items identified above were manufactured in conformity to:

☒ Approved design data and are in condition for safe operation.

☐ Non approved design data specified in block 12.

~~14a.~~ ☐ CAR 571.10 Maintenance Release

☐ Other regulation specified in block 12

Certifies that unless otherwise specified in block 12, the work identified in block 11 and described in block 12, has been performed in compliance with the *Canadian Aviation Regulations*.

13b. Signature	13c. Approved Organization Number	~~14b. Signature~~	~~14c. Approved Organization Number~~
AD 73-04 02	AMF 73-04		
13d. Name	**13e. Date (dd/mmm/yyyy)**	~~14d. Name~~	~~14e. Date (dd/mmm/yyyy)~~
Jeff Clarke - AD02	17 May 2016		

Installer Responsibilities

This certificate does not constitute authority to install.

Installers working in accordance with the national regulations of a country other than that specified in block 1 must ensure that their regulations recognize certifications from the country specified.

Statements in blocks 13a or 14a do not constitute installation certification. In all cases, the technical record for the aircraft must contain an installation certification issued in accordance with the applicable national regulations before the aircraft may be flown.

BELL PRATT

Aero Design

Parts Distribution Sheet

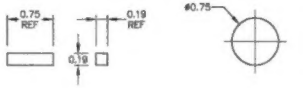
Description: B429 AFT BEAM

WO# 2016-73

From PO or WO #	Quantity	Description	Part Number	For WO #
15073	80"	1x2x1/8 304 TUBE		Beams
15030	7"	1x4 6061-T6		Lever (JIG)
15020	1"	1/2" Brass		Barrel
15024	1"	5/8x.120 S/S TUBE		
2016-16	1	Guide Tube	69830-11	
16003	2"	ø5/8 6061-T6		PIN
2014-84	1	TAB	95931-09	2016-73
14028	1 rod	ER308L rod	welding rod	2016-73
15073	1"	3/16" 304 square		2016-73
3021	1"x5"	0.050 304 SHT		

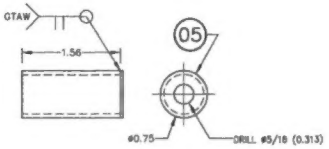
2016-73

REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE – CREATED FROM 95931, REV. 0		

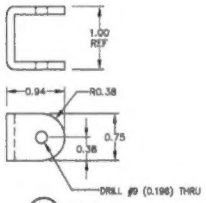


06 BLOCK

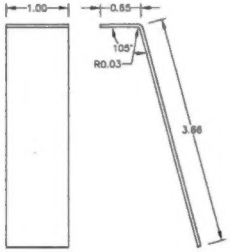
05 CAP



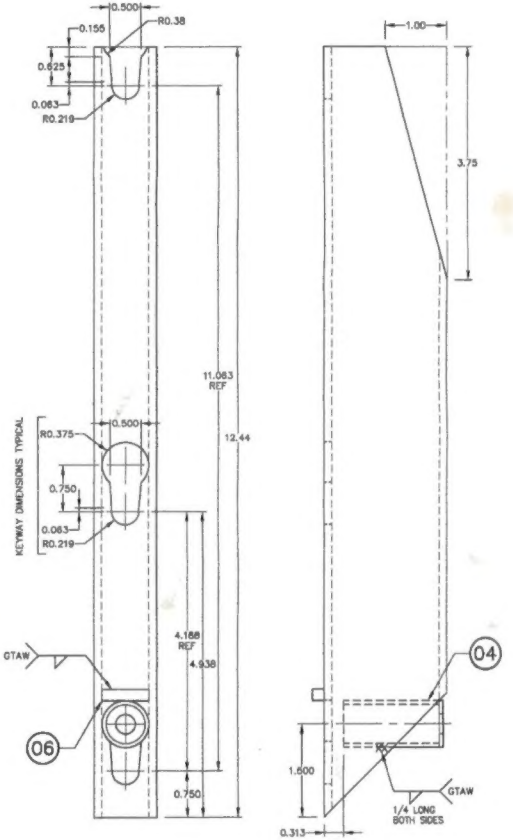
04 GUIDE



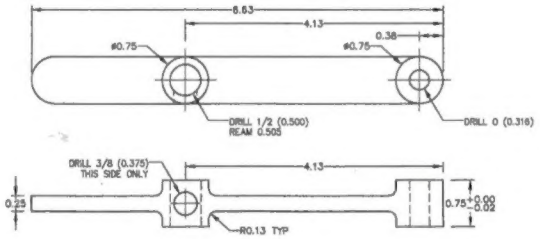
09 TAB



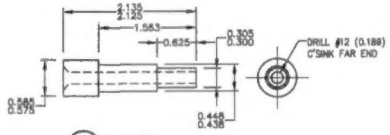
07 CAP



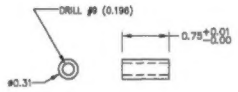
03 DOWN TUBE



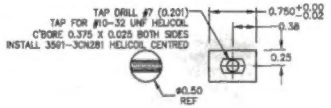
11 LEVER



10 STOP



13 BUSHING



12 BARREL NUT

APPROVALS	DATE
DRAWN: JEFF CLARKE	30 JAN 2014
CHECKED: JASON REKVE	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ON:
DECIMALS: X.XXX ±0.010, X.XX ±0.03, X.X ±0.1
ANGLES: ±1/2°

AERO DESIGN LTD.
9858A MALASPINA ROAD
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TEL: 604.480.8376 www.aerodesign.ca

BELL 429 – S/N 57081 & SUB.
QUICK RELEASE CARGO BASKET
AFT BEAM FABRICATION

SCALE 1 : 1	DWG. SIZE	DWG. NO.	REV.
SHEET 2 OF 2	A1	95933	0

MOUNTING BEAM FABRICATION – 95930/95921 and 95932/95933

Work Order: 2016-73 Batch Quantity: 1 AFT 95933-01-00 **Complete** (initial or SCA #)

Date Open: 11 MAY 2016

General

These instructions apply to mounting beams 95930 (forward) and 95931 (aft) for Bell 429 pre S/N 57081, and 95932 (forward) and 95933 (aft) for Bell 429 post S/N 57081 cargo baskets. Refer to the following drawings, at the current revision, for dimensions and details:

95930, Revision 1 – Forward Beam (pre S/N 57081)
95931, Revision 1 – Aft Beam (pre S/N 57081)
95932, Revision 0 – Forward Beam (post S/N 57081)
95933, Revision 0 – Aft Beam (post S/N 57081)
(Note: 95930 and 95932 are identical, except for bushing and plate hole locations)
(Note: 95931 and 95933 are identical, except for bushing and plate hole locations)

1. Beam Fabrication – 1x2 tubes AD 73-04 02
   a. Cut 1 x 2 x 0.12 material as indicated on drawings.
      i. 9593X-02 (long tube) at 65.00" with 45° angle at one end.
      ii. 9593X-03 (down tube) at 12.44" with 45° angle at one end. Do not cut upper taper.
      iii. One piece 4.44" long for 95930-04 hook and 95931-09 tab.
   b. Record material PO on attached material list.
   c. De-burr cut ends.
   d. Remove writing on tubes with acetone.
   e. Tag in-progress parts and place on in-progress shelf in machine shop for machining.

2. Machining AD 73-04 02
   a. Run CNC programs to machine keyways, slots and holes in component parts.
      i. O95980 for aft down tube slots
      ii. O95981 for forward down tube horizontal slots
      iii. O95985 for hook and tab
      iv. O95986 for upper slot in aft beam
      v. O95987 for lower slot in aft beam
   b. De-burr keyways, slots and holes.
   c. Using manual mill, drill 5/8 and 'F' holes in end of long tubes, located as shown on drawing.
      Note: The 5/8 hole location on pre S/N 57081 are different than post S/N 57081.
      i. Centre drill holes at 300 RPM.
      ii. Drill all holes through both sides at 300 RPM.
      iii. Drill 5/8 hole using a prentice drill at 300 RPM or end mill at 800 RPM.
   d. De-burr holes.
   e. Tag in-progress parts and place on in-progress shelf in welding shop for welding.

3. Component Fabrication AD 73-04 07
   Note: Some components are used for many different beams and are made in batches on separate component work orders. Check stock before making components.

a. Cut 95930-05 pads from 1.0 x 0.125 flat bar.
b. Cut 95930-06 stop brackets from 0.75 x 0.035 sqr. tube.
c. Cut and turn 95930-08 bushings, 95931-04 guide tube (equivalent to 69830-11), 95931-12 barrel nut and 95931-13 bushing:
    i. Cut stock to length + 0.03-0.06".
    ii. Face one end flat @ 1000 RPM.
    iii. Bushing only – drill #9 thru @ 300 RPM.
    iv. De-burr outside with a file and inside with de-burring tool at 300 RPM.
    v. Setup stop and face other end to length @ 1000 RPM.
    vi. De-burr outside with a file and inside with a de-burring tool at 300 RPM.
d. Cut 95931-06 (equivalent to 69830-07) blocks from 0.188" sqr. bar.
e. Punch 95931-05 cap from 0.050 sheet, 0.75 diameter. Flatten on steel table with a hammer.
f. Cut 1x1 aluminum to 6.75" for 95931-11 lever
g. Cut 95930-04 hook and 95931-09 tab from stock machined in step 2. Clean up cut ends, square inside corner at bend with a file, and bend hook to 12 degrees as shown.
h. Record component POs / WOs on attached material list.
i. Tag in-progress parts and place on in-progress shelf in welding shop and machine shop as applicable.

4. Barrel Nut Fabrication – 95931-12 Barrel Nut, blank from step 4c. AD 73-04 02 N/A ____
    a. On manual mill, center drill and tap drill #7 (0.201) at 500 RPM as shown on drawing.
    b. Tap for #10-32 helicoil.
    c. Spot face with 3/8 end mill at 500 RPM.
    d. Remove part from vise, thread tap into back side of hole, insert tap into drill chuck to locate barrel nut, grip in vise. Remove tap.
    e. Spot face with 3/8 end mill at 500 RPM.
    f. Install 3591-3CN281 self locking helicoil.
    g. Tag in-progress parts and place on in-progress shelf in machine shop.

5. Stop Pin Fabrication – 95931-10 Stop, blank from step 4c. AD 73-04 02 N/A ____
    a. Cut stock to length.
    b. Turn shank to sizes and lengths indicated @ 1000 RPM.
    c. Center drill and drill #12 at 300 RPM, approximately half way down.
    d. Flip part and turn head section to diameter and length indicated @ 1000 RPM.
    e. Center drill and drill #12 at 300 RPM, thru.
    f. Countersink at 300 RPM, screw head should sit slightly proud of top surface to prevent wear on the face of the pin.
    g. Tag in-progress parts and place on in-progress shelf in machine shop.

6. Machining – 95931-11 Lever AD 73-04 02 N/A ____
    a. Run CNC programs to machine lever:
        i. O95920 and O95921
    b. Deburr edges on buffing wheel.
    c. Drill and ream middle hole up to 0.505" on drill press.
    d. Drill 0.375" hole across 0.505" hole on manual mill.
    e. De-burr holes.

Complete
(initial or SCA #)

f. Tag in-progress parts and place on in-progress shelf in machine shop.

7. Beam Welding – 95930-03-XX Forward Down Tube AD 73-04 02 N/A _____
   a. TIG weld 95930-05 pads (2 places) and 95930-04 hook (one place) into 95930-03-XX down tube using ER308L rod.
   b. Record component and welding rod POs / WOs on attached material list.
   c. Tag in-progress parts and place on in-progress shelf in machine shop.

8. Guide Tube Welding – 95931-04 Guide Tube AD 73-04 ~~05~~
   a. TIG weld 95931-05 cap on to 95931-04 guide tube using ER308L rod.
   b. Record component and welding rod POs / WOs on attached material list.
   c. Tag in-progress parts and place on in-progress shelf in machine shop.

9. Turning – 95931-04 Guide Tube AD 73-04 ~~05~~ _____
   a. Turn outside of guide tube flush at weld to fit inside down tube.
   b. Drill through end cap with 5/16" (#4) center drill @ 300 RPM.
   c. Deburr both sides with deburring tool.
   d. Tag in-progress parts and place on in-progress shelf in welding shop.

10. Machining – 95930-03-XX Forward Down Tube N/A AD 73-04 02 _____
    a. Check down tube is straight following welding. Correct if required.
    b. Run CNC programs to machine keyways and slots.
       i. O95982 for forward down tube horizontal slots
    c. De-burr keyways, slots and holes.
    d. Tag in-progress parts and place on in-progress shelf in welding shop for welding.

11. Beam Fabrication – Down tubes AD 73-04 07 _____
    a. Cut upper taper on forward and aft down tubes.
    b. Deburr edges.
    c. Shear and bend 95930-07 caps
    d. Tag in-progress parts and place on in-progress shelf in welding shop for welding.

12. Beam Welding – 95930-01-XX or 95932-01-XX Forward Beam N/A AD 73-04 02 _____
    a. TIG weld 95930-08 bushing into 95930-02 or 95932-02 tube using ER308L rod.
    b. TIG weld 95930-03-XX down tube (from step 10.) to 95930-02 or 95932-02 tube using ER308L rod. Use jig to hold tubes at 90°.
    c. TIG weld 95930-06 stop brackets to side of down tube using ER308L rod, two places per tube, both sides. Use jig to align stop brackets for height and position.
    d. TIG weld 95930-07 cap to top of down tube.
    e. Record component and welding rod POs / WOs on attached material list.
    f. Tag in-progress parts and place on in-progress shelf in welding shop for straightening.

13. Beam Welding – 95931-01-00 or 95933-01-00 Aft Beam AD 73-04 ~~05~~ _____
    a. TIG weld 95931-04 guide tube into 95931-03 down tube using ER308L rod, ¼" weld on each side of guide as indicated on drawing. Use jig to hold guide tube at correct height and orientation.
    b. TIG weld 95930-08 bushing into 95931-02 or 95933-02 tube using ER308L rod.

c. TIG weld 95931-03 down tube (above) to 95931-02 or 95933-02 tube using ER308L rod. Use jig to hold tubes at 90°.
d. Assemble stop pin, lever, and barrel nut jigs with 95931-09 tab to locate tab on down tube. Stop pin must move freely through range of lever motion. TIG weld tab to down tube using ER308L rod.
e. TIG weld 95930-07 cap to top of down tube using ER308L rod.
f. Record component and welding rod POs / WOs on attached material list.
g. Tag in-progress parts and place on in-progress shelf in machine shop for straightening. AD 73-04 07

14. Straightening

Note: straightening the beams is critical for ease of installation of the cargo basket.

a. Straighten beams into plane using hydraulic press.
    i. Check beams for plane by setting beam on a flat surface (welding table) on blocks. Use two blocks under long tube as far apart as possible. Attempt to slide block under end of down tube. Record direction and approximate distance to make block fit.
    ii. Set beam on block under press ram, as close to corner at down tube as possible. Set the beam so that pushing down on the down tube will straighten the beam.
    iii. Pressurize ram to 800 psi to hold beam.
    iv. Clamp a snipe tube to down tube.
    v. Push down on snipe tube. Note pressure on press for applied deflection. Similar deflections will require similar pressure.
    vi. Check beams for plane, repeat steps ii-v if required.
b. Break sharp edges using scotchbrite disc on die-grinder.
c. Tag in-progress parts and place on in-progress shelf in machine shop. AD 73-04 02

15. Machining

a. Run CNC programs to drill holes for mounting plates.
    i. O95984 for 95930-01-XX and 95931-01-00 (pre S/N 57081).
    ii. O95988 for 95932-01-XX and 95933-01-00 (post S/N 57081).
b. De-burr holes.
c. Tag in-progress parts and place on in-progress shelf in machine shop for inspection. AD 73-04 01

16. Final Inspection

To be completed by a different person than the previous steps.

a. Inspect beams 95930-01-XX and 95931-01-00 or 95932-01-XX and 95933-01-00 as applicable for conformity to drawing.
b. Tag in-progress parts ready for powder coating.

17. Powder Coating

a. Parts are to be powder coated in accordance with commercial practices. N/A AD 73-04 02
b. Record powder coating PO.
c. Inspect powder coating on receiving.
d. Tag in-progress parts ready for final assembly.

to be painted by customer shipped primed

MOUNTING BEAM FABRICATION – 69830/69831 **Complete** (initial or SCA #)

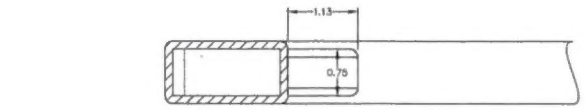
18. Final Assembly AD 73-04 02 N/A - not assembled to be painted by customer _____

To be completed after powder coating.

a. Check installation of fixed cabin step in open end of beams. Clear powder coating if necessary with a file.
b. Assemble 95930-01-XX or 95932-01-XX forward beam:
    i. Adhere P/N placard to top surface of beam, near center of long tube on top surface.
c. Assemble 95931-01-00 or 95933-01-00 aft beam:
    i. Assemble 95931-11 Lever with 95931-13 Bushing and 95931-12 Barrel nut with beam using AN3-13A bolt, NAS1149F0363P washers (2), and MS21044N3 nut. Torque bolt to 20-25 in-lbs. Ensure lever moves freely with bolt.
    ii. Install 95931-10 stop and 69830-23 spring into guide with #10-32 x 2.5" countersunk screw threaded into barrel nut in lever. Torque screw to 20-25 in-lbs. Check for function, lever must move freely and snap back to locked position when released.
    iii. Adhere P/N placard to top surface of beam, between strap and end on top surface.
d. Green tag completed beam assemblies and place into stock.

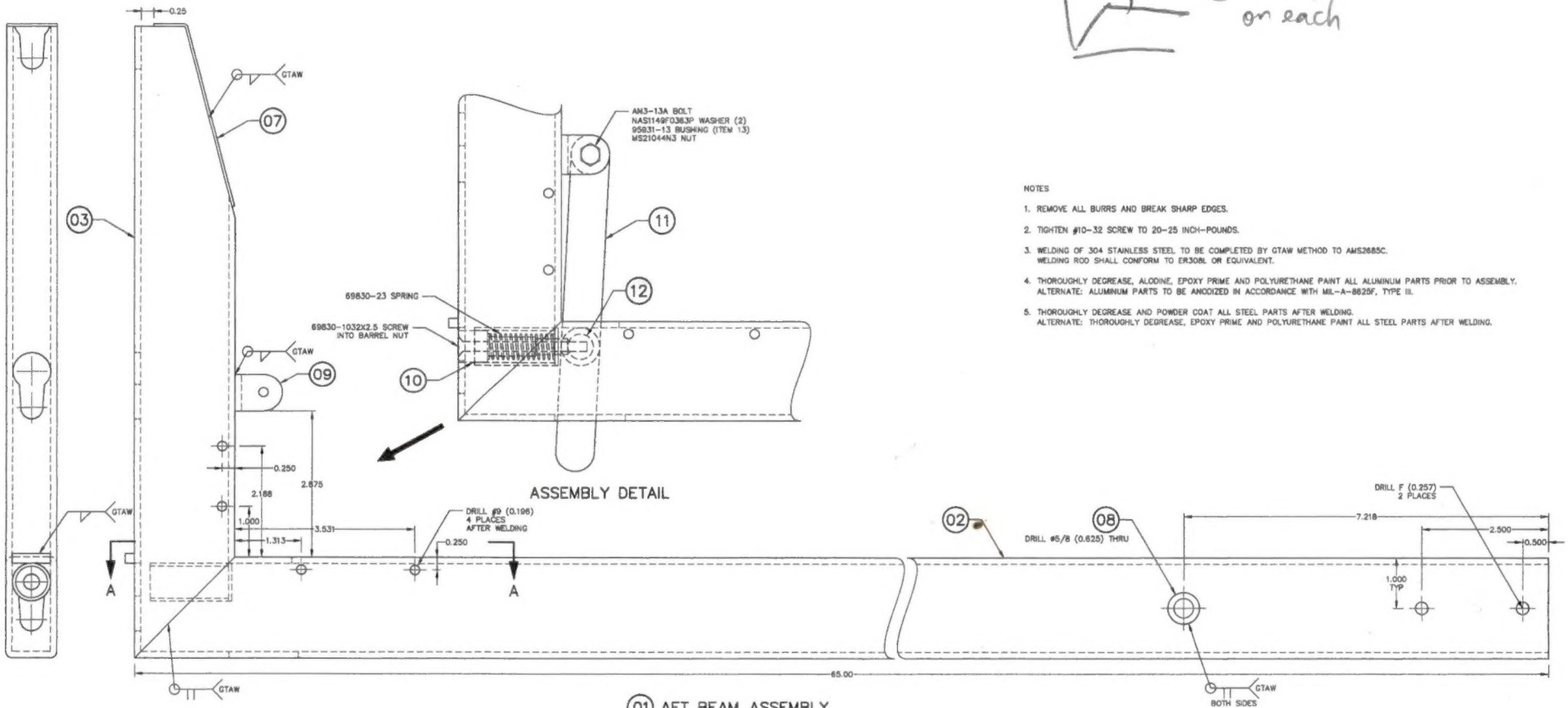
2016-73

REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE – CREATED FROM 95931, REV. 0		



SECTION A–A

91.7 (44° cut) on each

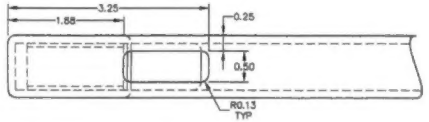


ASSEMBLY DETAIL

(01) AFT BEAM ASSEMBLY

NOTES

1. REMOVE ALL BURRS AND BREAK SHARP EDGES.
2. TIGHTEN #10-32 SCREW TO 20-25 INCH-POUNDS.
3. WELDING OF 304 STAINLESS STEEL TO BE COMPLETED BY GTAW METHOD TO AMS2685C. WELDING ROD SHALL CONFORM TO ER308L OR EQUIVALENT.
4. THOROUGHLY DEGREASE, ALODINE, EPOXY PRIME AND POLYURETHANE PAINT ALL ALUMINUM PARTS PRIOR TO ASSEMBLY. ALTERNATE: ALUMINUM PARTS TO BE ANODIZED IN ACCORDANCE WITH MIL-A-8625F, TYPE III.
5. THOROUGHLY DEGREASE AND POWDER COAT ALL STEEL PARTS AFTER WELDING. ALTERNATE: THOROUGHLY DEGREASE, EPOXY PRIME AND POLYURETHANE PAINT ALL STEEL PARTS AFTER WELDING.



12 QTY	04 QTY	03 QTY	01 QTY	PART NO.	ITEM	DESCRIPTION	MATERIAL	MATERIAL SPEC	STOCK SIZE
			1	69830-23		SPRING			
			2	69830-1032X2.5		SCREW			
			1	MS21044N3		NUT			
			2	NAS1149F0363P		WASHER			
			1	AN3-13A		BOLT			
1				3591-3CN281		SELF-LOCKING THREAD INSERT	HELICOIL		
			1	95931-13	13	BUSHING	BRASS	ASTM B927	ø0.313 ROD
			1	95931-12	12	BARREL NUT	BRASS	ASTM B927	ø0.5 ROD
			1	95931-11	11	LEVER	6061-T6 ALUMINUM	QQ-A-200/8	1 X 1 BAR
			1	95931-10	10	STOP	6061-T6 ALUMINUM	QQ-A-200/8	ø0.625 ROD
			1	95931-09	09	TAB	304 STAINLESS STEEL	ASTM A554	1 X 2 X 0.125 TUBE
			1	95930-08	08	BUSHING	316 STAINLESS STEEL	ASTM A269	ø0.825 X 0.120 TUBE
			1	95931-07	07	CAP	304 STAINLESS STEEL	AMS 5513	0.050 SHEET
		1		95931-06	06	BLOCK	304 STAINLESS STEEL	ASTM A479	0.75 X 0.188 BAR
	1			95931-05	05	CAP	304 STAINLESS STEEL	AMS 5513	0.050 SHEET
		1		95931-04	04	GUIDE	316 STAINLESS STEEL	ASTM A269	ø0.75 X 0.065 TUBE
			1	95931-03	03	DOWN TUBE	304 STAINLESS STEEL	ASTM A554	1 X 2 X 0.125 TUBE
			1	95933-02	02	TUBE	304 STAINLESS STEEL	ASTM A554	1 X 2 X 0.125 TUBE
			1	95933-01-00	01	AFT BEAM ASSEMBLY			

LIST OF MATERIALS

APPROVALS		DATE
DRAWN:	JEFF CLARKE	30 JAN 2014
CHECKED:	JASON REKVE	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ON:
DECIMALS: X.XXX ±0.010, X.XX ±0.03, X.X ±0.1
ANGLES: ±1/2°

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BELL 429 – S/N 57081 & SUB.
QUICK RELEASE CARGO BASKET
AFT BEAM FABRICATION

SCALE 1 : 1	DWG. SIZE	DWG. NO.	REV.
SHEET 1 OF 2	A1	95933	0